

Special Issue Honouring Helias A. Udo de Haes: Columns

Will the Next 10 Years be as Productive in Advancing Life Cycle Approaches as the Last 15 Years?

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This Foreword's premise is that much has occurred with respect to building the supply for life cycle approaches, including the early efforts of SETAC, ISO, and the current UNEP/SETAC Life-Cycle Initiative, but not enough has been accomplished to building the demand. Helias Udo de Haes has been one of the leaders world wide in advancing the development and practice of life cycle approaches. Helias and I have known each other for over 15 years and have shared many eventful discussions on life cycle approaches, its value and methodology. He and I have come at LCA sometimes from different directions and certainly from different experiences, but we did share one thing in common - we wanted to see life cycle approaches advance to a point where they can play an important role in making our society more sustainable. With Helias retiring this year, his insights and knowledge will be dearly missed and I for one will no longer have a partner to debate life cycle ideas and continue with its development. But I did learn over the years, that Helias is an active bird watcher – so hopefully our paths will continue to cross in the birding field.

With Helias retiring and leaving his legacy on life cycle approaches, I see over the next ten years, both the demand and supply for life cycle thinking, life cycle management and life cycle assessment¹ will be enhanced, with particular emphasis on the demand side. Examples of this demand side include governments beginning to develop product-oriented policies based upon life cycle approaches; the UN Sustainable Consumption and Production 10-year program arising from the World Summit in 2002 calls for a life cycle economy; Green building organizations are examining how LCA can be used to improve the fundamental criteria for defining green buildings; and companies are using life cycle approaches to identify improvement opportunities in product design and development and then how to use the life cycle information to communicate to customers and other downstream users.

Some of the drivers which are influencing this shift towards more demand for life cycle approaches are briefly discussed here.

¹ For this Foreword I refer to these three as life cycle approaches.

Implications from World Summit on Sustainable Development (WSSD)

At the WSSD in Johannesburg in 2002, world leaders recognised the need to change the unsustainable patterns of production and consumption, and stated that: "We must develop production and consumption policies to improve the products and services provided, while reducing environmental and health impacts, using, where appropriate, science based approaches, such as Life Cycle Analysis". According to the WSSD, life cycle approaches will have to play a key role; but these approaches must suit the requirements of all relevant stakeholders, particularly those from developing countries. Both capacity building and training have to provide important contributions in order to achieve this. Furthermore the ministers suggested the development of programmes to support sustainable consumption and production patterns, based on science-based approaches such as life cycle approaches. Work by organizations like UNEP with its sustainable consumption and production program and the UNEP/SETAC Life Cycle Initiative will help establish the pull for life cycle approaches in governments worldwide.

Green Building Applications

One of the areas that have gained considerable momentum is designing, constructing, operating and demolition of buildings. UNEP indicated that 39% of total energy use (both direct and indirect) could be attributed to shelter. The USGBC (www.usgbc.org) estimates that buildings in the US contribute to: 36% of total energy use; 65% of electricity consumption; 30% of greenhouse gases emissions; 30% of raw materials use; 30% of waste output/136 million tons annually; and 12% of potable water consumption. Significant opportunities exist to improve the environmental and social impacts/footprints associated with shelter over its life cycle. The US Green Building Council is exploring how LCA might be used as a framework for the next generation of the USGBC's LEED® (Leadership in Energy and Environmental Design) Green Building Rating System. Architects will have an increased role in influencing sustainable designs.

Public Sector Procurement

Three examples of green public procurement are the US Environmental Preferable Purchasing, US Bio-Based Procurement, and Mexico's Semarnat program.

Environmentally Preferable Purchasing (EPP) is a US federal-wide program that encourages and assists Executive agencies in the purchasing of environmentally preferable products and services. Environmentally preferable is defined as "...products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose..." (US Executive Order 13101).

The United States consumes approximately 25% of the world's resources with only 5% of the world's population. The U.S. federal government is the single largest consumer of goods and services in the U.S. – spending more than \$200 billion annually on goods and services. The federal government also spends an additional \$240 billion a year, indirectly, through grant disbursements. The US government recognizes its influence it has on what products and services are produced due to this tremendous purchasing power. EPP works to leverage that influence to minimize environmental burdens. The benefits of environmentally preferable purchasing include:

- Improved ability to meet existing environmental goals
- Improved worker safety and health
- Reduced liabilities
- Reduced health and disposal costs

According to the US Environmental Protection Agency, EPP has five Guiding Principles (see <<http://www.epa.gov/oppt/epp/pubs/guidance/fivegp.htm>> for additional information):

- *Guiding Principle 1: Environment + Price + Performance = Environmentally Preferable Purchasing* – Environmental considerations should become part of normal purchasing practice, consistent with such traditional factors as product safety, price, performance, and availability.
- *Guiding Principle 2: Pollution Prevention* – Consideration of environmental preferability should begin early in the acquisition process and be rooted in the ethic of pollution prevention, which strives to eliminate or reduce, up-front, potential risks to human health and the environment.
- *Guiding Principle 3: Life Cycle Perspective/Multiple Attributes* – A product or service's environmental preferability is a function of multiple attributes from a life cycle perspective.
- *Guiding Principle 4: Comparison of Environmental Impacts* – Determining environmental preferability might involve comparing environmental impacts. In comparing environmental impacts, Federal agencies should consider: the reversibility and geographic scale of the environmental impacts, the degree of difference among competing products or services, and the overriding importance of protecting human health.
- *Guiding Principle 5: Environmental Performance Information* – Comprehensive, accurate, and meaningful information about the environmental performance of products or services is necessary in order to determine environmental preferability.

US Department of Agriculture (USDA) published on January 11, 2005, its final rule for designating items made with biobased products for preferential Federal procurement (70 FR 1792). This rule became effective on February 10, 2005. Federal agencies must purchase biobased products unless they are not reasonably available, fail to meet performance standards, or are available at an unreasonable price. The legislative intent is to:

- Improve demand for biobased products and thus stimulate consumption of domestic agricultural feedstocks
- Spur development of value-added agricultural processing and manufacturing in rural communities
- Enhance the nation's security by substituting renewable based feedstocks for fossil based feedstocks.

Life cycle assessment studies are one of the ways to illustrating environmental performance of bio-based materials.

In Mexico, The Secretariat of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales-Semarnat) carries on the Sustainable Management Program (Programa de Administración Sustentable), the main purpose of which is to decrease the negative environmental impact of day-to-day activities at the workplace². The principal lines of action are: electrical energy savings, rational water use, responsible usage of paper, and sound waste management. Appropriate paper usage includes so-called 'green purchases'.

EuP Directive

The EuP Directive is a framework directive, which will be followed by implementing measures establishing eco-design requirements. It will be these implementing measures that will establish eco-design requirements for particular aspects and products. The proposed Directive is applicable to any product using energy to perform the function for which it was designed, manufactured and put on the market. The framework directive presents three general requirements for implementing measures: eco-design parameters requirements, information supply requirements, and assessment requirements for the manufacturer.

Other Drivers

Downstream companies are beginning to recognize the influence they have on their upstream value chain as a result of their own analysis of their risks and opportunities, as well as a beginning consumer demand for more "environmentally preferable products – e.g., organic foods and cotton". One of the ways that society has responded is the development of certification programs, such as the Marine Stewardship Council, Sustainable Forestry Initiative, Forest Stewardship Council to name a few.

² Commission for Environmental Cooperation of North America. 2003. Green Procurement: Good Environmental Stories for North Americans. Prepared by Five Winds International. 55 pp. <http://www.fivewinds.com/uploadedfiles_shared/GreenProcurementReview2e1.pdf>

Moreover, there are major society needs (e.g., food, water, disease) that if not met will severely affect society's ability to survive³. While we must do the things we current do more efficiently, we must also innovate in terms of new products and technologies to create a more sustainable world. The green designer William McDonough has written a book with Michael Braungart entitled 'Cradle to Cradle'⁴, which lays out core principles and values on more effective products.

Unlike the more 'traditional' site-specific approaches to environmental protection and societal/community responsibility, product sustainability strategies have implications that extend across a product's life cycle and beyond direct control of any one company or organization. Engaging the stakeholders who can and do influence the ability to manufacture and sell products around the world will be required. Due to the global nature of today's supply chains, requirements originating in Europe (e.g., REACH or end-of-life directives) or Asia will have direct consequences elsewhere around the world.

Collectively these other drives will continue to place demands and pressures on businesses and governments to utilize life cycle approaches to understand the risk and benefits associated with products over their entire life cycle. Sustainability includes not only the environmental and societal aspects but an economic component as well. Trade-off will involve long term recognition of life cycle based costs (and investments) and benefits.

Summary

Since the early efforts by SETAC-North America and SETAC-Europe on life-cycle assessment, ISO 14040 family of LCA standards have been published and are undergoing updating; UNEP and SETAC have joined forces to establish the UNEP/SETAC Life Cycle Initiative to continue to build the supply and capacity for life cycle approaches.

What is needed to continue to build a greater demand is a fundamental shift to a proactive product life cycle strategy which will redirect corporate, government, and other stakeholder resources to understand, identify, and manage risks, opportunities and trade-offs associated with products, technologies and services over their whole life cycle – a 'cradle-to-grave' or 'cradle-to-cradle' perspective. The drivers outlined in this Foreword are but a few of the major demands that will become increasingly available to foster greater use of life cycle approaches. Of the ones listed above, sustainable public procurement and sustainable buildings will likely create the most immediate demand for life cycle approaches, followed by companies who want to ensure protection and enhancement of their brands. Even upstream

sectors like the metals and mining are positioning themselves not as 'mining' firms but as product firms where their knowledge and partnership with downstream companies allow managing the risks and creating opportunities. It will be interesting to watch whether and how the financial sector incorporates life cycle approaches into their sustainability rating schemes (e.g., DJSI and FTSE4Good). If that happens we might see another demand for life cycle approaches.

But significant gaps still exist in the way that companies and governments manage the risks, on one hand, and create opportunities, on the other hand, associated with products over the entire life cycle, from material acquisition, manufacturing, and use, to end of life management. The fundamental shift to life cycle based product strategies requires changes in well-established business and operating policies and practices that are not easily modified. A few of these gaps include:

- Companies are not traditionally used to identifying and managing environmental and societal issues associated with their products, except for specific legal requirements. Their normal experience is to deal with environmental issues associated with their operations.
- Governments have been traditionally looked upon as the regulatory agency (enemy so to speak) that influence what a company can do or not do with respect to environmental and social issues. Industries are often looked upon by the governments as wanted to pollute the world. For a product strategy to take place, industry and governments must become partners to understand and manage those risks and opportunities along the value chain.
- Internal departments within companies and governments are not use to working with each other. For example, air issues were managed by an air department and water issues by a water department. Life cycle approach requires these departments to work together where the product is the underlying organization unit, not the environmental medium.

Businesses and governments are and will continue to take actions to fill these gaps. For example, a Product Sustainability Roundtable (<http://www.fivewinds.com/roundtables/roundTables.cfm>) has been established to help companies along the supply chain benchmark and share best practices in identifying risks and opportunities associated with products over their life cycle. One company established a design for environment position and filled it with someone from the design community instead of the environmental community.

Systematic planning and actions are required *now* to maintain competitiveness and identify a competitive edge in today's global environment. The increase in the demand side for use of life cycle approaches will be a key component of these actions.

³ See the Millennium Ecosystem Assessment report entitled 'Living Beyond Our Means: Natural Assets and Human Well-being' (Statement of the MA Board). United Nations 2005

⁴ William McDonough & Michael Braungart, 2002. Cradle to Cradle. North Point Press